

Changes to the coding of causes of death between 2010 and 2011

This document explains the main effects of National Records of Scotland (NRS) upgrading from the 2006 version to the 2010 version of the US National Centre for Health Statistics automatic cause of death coding software Mortality Medical Data System (MMDS)

In January 2011, the then General Register Office for Scotland (GROS) upgraded its software for coding the causes of death to take account of a number of updates that the World Health Organisation (WHO) had made to the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10). The then GROS coded the causes of deaths registered up to the end of 2010 using the '2006' version of the Mortality Medical Data System and coded deaths registered from the start of 2011 using the '2010' version of MMDS. Because the 2010 version took account of some WHO updates which changed how certain causes of death are coded there are a number of breaks in the continuity of the statistics between 2010 and 2011. Further information about WHO updates to ICD-10 can be obtained at:

<http://www.who.int/classifications/icd/icd10updates/en/index.html>

This note describes the main changes to the classification of causes of deaths which result from upgrading from the '2006' version to the '2010' version of MMDS, with particular reference to those which:

- alter the letter at the start of the ICD-10 code for the underlying cause of death; and
- are believed to affect at least 50 deaths per year.

NRS estimated these numbers in one or both of the following two ways:

- first, by processing the cause of death information for a whole year's cases using both the '2006' and '2010' versions of the software, which allowed NRS to compare the codes for the underlying cause of death that were allocated by the two versions of the software, and so identify the circumstances in which there might be a 'big' change to the coding of the underlying cause of death for a 'large' number of cases (before any manual intervention by coding staff); and
- second, by selecting, from all the records of deaths, the ones to which a WHO update would be expected to apply (because they had been given particular codes and/or had certain things mentioned in the cause of death).

The overall scale of change is small: it is estimated that, for Scotland as a whole, roughly 1,000 to 1,100 deaths per year (or about 2% of the total of 53,856 deaths registered in 2009) will be given a code which starts with a different letter (representing a different chapter or major section in ICD-10) from the code that would previously have been assigned to them.

However, **the scale of the change varies between causes of death:** it represents a large percentage for some, and has very little or no effect on others. Most of the deaths whose coding is affected by the change would have been counted in just a few of the 19 chapters of ICD-10 which can be used for the underlying cause of death.

The table below gives the approximate numbers of deaths for which the first letter of the ICD-10 code for the underlying cause of death will be changed. For simplicity, all the figures have been rounded to the nearest ten, and numbers which would round to ten or zero do not appear. The row and column totals in the table show the estimated effects of the change on the numbers of deaths from certain causes listed below. The percentages are based on the numbers of deaths from these causes that were registered in 2009. The changes are as follows:.

- an increase of 460 (21%) for External causes (ICD-10 codes V01-Y98);
- a reduction of 350 (5%) for Respiratory system diseases (J00-J99);
- a reduction of 340 (14%) for Mental and behavioural disorders (F00-F99) - because the drop of 480 (shown at the foot of the 'Mental and behavioural disorders' column) is partly offset by the rise of 140 (shown at the end of the 'Mental and behavioural' disorders row);
- an increase of 270 (16%) for Nervous system diseases (G00-G99);
- a reduction of 160 (13%) for Genitourinary system diseases (N00-N99);
- an increase of 90 (1%) for Circulatory system diseases (I00-I99);
- an increase of 70 (8%) for Certain infectious and parasitic diseases (A00-B99);
- a reduction of 60 (2%) for Digestive system diseases (K00-K99);
- an increase of 40 (0%) for Neoplasms (C00-D98).

It is believed that the change has little or no effect on the figures for other causes of death.

Estimated numbers of deaths (registered in Scotland per year) for which the letter at the start of the ICD-10 code for the underlying cause of death will be altered by the change from the '2006' version to the '2010' version of MMDS

	PREVIOUS Underlying Cause of Death					
	Mental and behavioural disorders (F00-F99)	Respiratory system diseases (J00-J99)	Digestive system diseases (K00-K99)	Genitourinary system diseases (N00-N99)	All causes (incl. other chapters not shown in this table)	
NEW Underlying Cause of Death						
Certain infectious and parasitic diseases (A00-B99)	*	*	60	*	70	
Neoplasms (C00-D98)	*	40	*	*	40	
Mental and behavioural disorders (F00-F99)	n-a	50	*	90	140	
Nervous system diseases (G00-G99)	*	200	*	40	270	
Circulatory system diseases (I00-I99)	30	30	*	30	90	
External causes (V01-Y98)	440	*	*	*	460	
All causes (incl. other chapters)	480	350	60	160	1,060	

* : any number is believed to be small (at most 15)

Subsequent paragraphs describe, in more detail, the 'main' changes in the coding of particular causes of death (i.e. those changes which contribute to the values of 50 or more which appear in the body of the above table), starting with a separate paragraph for each of the two changes which, together, alter the coding of roughly 440 deaths from 'Mental and behavioural disorders' to 'External causes' .

'Drug abuse' deaths from 'accidental poisoning' or 'acute intoxication' – a WHO update specified that deaths for which the underlying cause would previously have been coded as 'mental and behavioural disorders due to psychoactive substance use' (ICD-10 codes F10-F19) should now:

- when 'accidental poisoning' is mentioned, be coded as 'accidental poisoning by and exposure to noxious substances' (X40-X49);
- when 'acute intoxication' is mentioned, be coded as whichever of the following is appropriate, depending upon what (if anything) is known about the intent behind the action:
 - 'accidental poisoning by and exposure to noxious substances' (X40-X49);
 - 'intentional self-poisoning' (X60-X69);
 - 'assault' (X85-X90); or
 - 'poisoning ... undetermined intent' (Y10-Y19).

Had 2009's deaths been coded in this way, roughly 370 'drug abuse' deaths which were counted under 'mental and behavioural disorders' (F codes) would instead have been coded as 'poisoning' (mainly 'X' codes, but 'Y' codes if the intent was undetermined). They included about 210 which were counted under 'mental and behavioural disorders due to the use of opioids' (F11) and around 150 which were coded as 'mental and behavioural disorders due to multiple drug use and use of other psychoactive substances' (F19). So, there will be breaks in the time series for the 'F' codes, the 'X' codes and the 'Y' codes. However, **there should be no effect on the overall total number of drug-related deaths**, since the standard definition of drug-related deaths counts the relevant 'X' and 'Y' codes as well as the relevant 'F' codes (provided that a substance listed under the Misuse of Drugs Act was reported as being present in the body).

'Alcohol abuse' deaths from 'acute intoxication' - the WHO update which is mentioned above also affects some of the deaths which would previously have had 'mental and behavioural disorders due to use of alcohol' (F10) as the underlying cause of death: when 'acute intoxication' is mentioned, they should now be coded as 'accidental poisoning by and exposure to alcohol' (X45).

Had 2009's deaths been coded in this way, roughly 60 of the 'alcohol abuse' deaths which were counted under 'mental and behavioural disorders due to use of alcohol' (F10) would instead have been coded as 'accidental poisoning ...' (X45). So, again, there will be breaks in the time series for both the 'F' codes and the 'X' codes. However, **there should be no effect on the overall total number of alcohol-related deaths**, since the standard definition of alcohol-related deaths counts 'X45' as well as 'F10' .

Bronchopneumonia deaths of people for whom Alzheimer's disease was mentioned in Part II of the Medical Certificate of the Cause of Death (MCCD) - the scope of ICD-10 coding Rule 3 (part of which specifies that pneumonia should be considered an obvious consequence of wasting diseases and diseases causing paralysis) has been widened, as recommended by the WHO Mortality Reference Group. This affects some of the deaths which would previously have been coded as being due to 'bronchopneumonia' (J18.0): if Alzheimer's disease is mentioned in Part II of the MCCD, their underlying cause will now be coded as 'Alzheimer's disease'

(G30) - unless other medical conditions also happen to be mentioned in Part II and the application of the coding rules causes another code to be allocated. Had 2009's deaths been coded in this way, roughly 150 of the deaths for which 'bronchopneumonia' (J18.0), or another code within 'J18 - pneumonia, organism unspecified', was coded as the underlying cause of death would instead have been coded as due to 'Alzheimer's disease' (G30). So, there will be breaks in the time series for both the 'G' codes and the 'J' codes.

'Urinary tract infection' deaths of people who had dementia - a WHO update:

- extended the explanatory notes for ICD-10 coding Rule 3 to state that 'Other common secondary conditions (such as pulmonary embolism, decubitus ulcer, and cystitis) should be considered an obvious consequence of wasting diseases (such as malignant neoplasm and malnutrition) and diseases causing paralysis (such as cerebral haemorrhage or thrombosis) as well as communicable diseases, and serious injuries'; and
- added a list of conditions which should be considered obvious consequences of wasting and paralysing diseases. One entry in the list specified that 'urinary tract infection, site not specified' should be considered an obvious consequence of 'diseases causing paralysis or inability to control bladder' .

This affects some of the deaths which would previously have been coded as being due to 'urinary tract infection, site not specified' (N39.0): if a type of dementia (such as 'vascular dementia' or 'unspecified dementia') is also mentioned in the MCCD, it will be coded as the underlying cause, unless other medical conditions also happen to be mentioned and the application of the coding rules causes another code to be allocated.

Had 2009's deaths been coded in this way, roughly 90 of the deaths for which 'urinary tract infection, site not specified' (N39.0) was coded as the underlying cause of death would instead have been coded as being due to, say, 'vascular dementia' (F01) or 'unspecified dementia' (F03). So, there will be breaks in the time series for both the 'N' codes and the 'F' codes.

Deaths from gastroenteritis and colitis of unspecified origin - previously, the ICD-10 coding rules stated that, in countries (like the UK) where conditions like gastroenteritis and colitis of unspecified origin can be assumed to be of non-infectious origin, the code 'non-infective gastroenteritis and colitis, unspecified' (K52.9) should be used when such conditions were of unspecified origin. However, a WHO update added a new code for 'gastroenteritis and colitis of unspecified origin' (A09.9), and stated that this code should be used in such cases.

Had 2009's deaths been coded in this way, around 60 of the deaths for which 'non-infective gastroenteritis and colitis, unspecified' (K52.9) was coded as the underlying cause of death would instead have been coded as being due to 'gastroenteritis and colitis of unspecified origin' (A09.9). So, there will be breaks in the time series for both the 'K' codes and the 'A' codes.

'Lower respiratory tract infection deaths' of people who had dementia - as with the change (mentioned earlier) for 'bronchopneumonia' deaths of people who had Alzheimer's disease, this change is due to the widening of the scope of ICD-10 coding Rule 3. It affects some of the deaths which would

previously have been coded as being due to ‘unspecified acute lower respiratory tract infection’ (J22): if vascular dementia (F01) or unspecified dementia (F03) is also mentioned in Part II of the MCCD, their underlying cause will now be coded as that (unless other medical conditions also happen to be mentioned and the application of the coding rules causes another code to be allocated).

Had 2009's deaths been coded in this way, roughly 50 of the deaths for which ‘unspecified acute lower respiratory tract infection’ (J22) was coded as the underlying cause of death would instead have been coded as due to vascular dementia (about 10 cases) or unspecified dementia (around 40 cases). So, there will be breaks in the time series for both the ‘F’ codes and the ‘J’ codes.

There are several other types of case for which WHO updates (those which were implemented after the ‘2006’ version, and by the ‘2010’ version, of MMDS) lead to changes in what will be coded as the underlying cause of death. However, the estimated annual number of deaths for each such case is smaller than for the ones which have been described in the preceding paragraphs, so they are not discussed in this note. The estimated net effects of such changes on the numbers of deaths by cause are included in the figures in the table which appears above. In addition, the spreadsheet [Changes to the coding of causes of death - list of 3-character codes lists](#) lists all the types of case for which, it is believed, any of the first three characters of the ICD-10 code will be changed, for at least ten deaths per year.

This list shows the combinations of ‘previous’ and ‘new’ ICD-10 codes for which there were at least ten deaths. However, some changes affect several different combinations of ICD-10 codes. While individually each of the combinations involved may have fewer than ten deaths, the total number of deaths for all the combinations of the codes that were affected may be larger than 10. For example, the list does not show the number of cases for which there has been a change from ‘pneumonia’ to ‘cancer’ as the underlying cause of death. This is because that change involved only single figure numbers of deaths for each of the 3-character ICD-10 codes for various types of cancer. However, the total number of such cases is included in the total figure for changes from ‘Respiratory system diseases (J00-J99)’ to ‘Neoplasms (C00-D98)’ shown in the table above.